

Diet Impacts on Climate and Health: New Zealand's Experience

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Production of meat from ruminant animals has been identified as a major source of greenhouse gas emissions, especially compared with other food categories.^{1,2} But what about in New Zealand, where cows and sheep are allowed to graze rather than being confined to feedlots³—an arguably climate-friendlier alternative due to lower feed inputs and the potential for carbon sequestration?⁴ Are meat and dairy still so much worse for the climate? The answer, according to a team of researchers reporting in *Environmental Health Perspectives*, is clear: Even under these conditions, animal-based foods, particularly red and processed meats, are responsible for significantly more greenhouse gas emissions than vegetables, fruits, legumes, and whole grains.⁵

“There’s been a lot of uncertainty about how New Zealand relates to the rest of the world and the climate impacts of our diet,” says lead author Jonathan Drew, a medical student at the University of Otago, Dunedin. “There’s really strong global evidence⁶ that shows that diets that are predominately plant-based are much more climate-friendly than typical Western diets. What we find in New Zealand is surprisingly similar to what has been found elsewhere.”

Drew and his colleagues from the University of Otago started with a 2013 life cycle assessment database of foods eaten in the United Kingdom.⁷ The team then adapted these data to develop a New Zealand–specific database of estimated greenhouse gas

emissions associated with seven life cycle stages: farming and processing, transportation, transit packaging, consumer packaging, warehousing and distribution, refrigeration, and supermarket overheads.

Beef and lamb ranked at the top of the list, representing 21 and 17 kg of carbon dioxide equivalents per kilogram of food (kgCO₂e/kg)—a measure of what is known as climate impact—although these figures are below previously reported global averages of 27 and 26 kgCO₂e/kg.⁸ Butter and cheese, meanwhile, were rated at 11 and 10 kgCO₂e/kg, respectively, whereas eggs were rated at 4.9 kgCO₂e/kg.

Highly processed sugary items (including baked goods, ice cream, and soft drinks) averaged in the 2–4 kgCO₂e/kg range. Most plant-based foods contributed less than 2 kgCO₂e/kg, although rice had a climate impact of 4.1 kgCO₂e/kg and the nuts, seeds, and dried fruit category clocked in at 3.6 kgCO₂e/kg. Rice production emits methane as organic material decomposes in flooded fields. The farming and processing of nuts, seeds, and dried fruit, on the other hand, requires more inputs of energy (e.g., fuel for irrigation, dehulling, and drying) and material (e.g., fertilizer). These foods are therefore relatively emissions-intensive, compared with other plant-based foods, Drew says.

Moreover, in a secondary analysis the researchers estimated that switching New Zealand’s adult population to climate-friendly



Even in New Zealand, where grazing is the norm for livestock production, beef had by far the highest estimated climate impact of all the foods assessed in this study. Image: © Salena Stinchcombe/Shutterstock.

diets, while conforming to existing dietary guidelines, would lead to tens of billions of dollars in health care savings—and generally to longer, healthier lives.

Despite local differences, “their analyses came to very similar conclusions as we reported for the world as a whole,” says Walter Willett, a professor of epidemiology and nutrition at the Harvard T.H. Chan School of Public Health, who served as cochair of the EAT-Lancet Commission’s 2019 global study of human health and sustainable food production.⁹ “Shifting to diets lower in animal-sourced foods—especially beef and lamb—and higher in legumes, nuts, soy foods, fruits, and vegetables would substantially reduce greenhouse gas production from the food system and also have many important health benefits.”

The authors echo the EAT-Lancet Commission’s exhortation⁹ that such shifts are not merely warranted but increasingly urgent in the face of accelerating climate change. Yet for a variety of reasons, progress will not come easily, says study coauthor Alex Macmillan, a University of Otago associate professor in environmental health. That is true even in environmentally conscious New Zealand, where more than 80% of the electricity is derived from renewable sources.¹⁰

Population-scale change through revised dietary guidelines, financial incentives, and other policies is likely to encounter resistance from commercial interests, Macmillan says. Another challenge will be altering many individuals’ long-held beliefs that meat and dairy products are essential parts of a healthy diet. “I think it’s pretty clear from the evidence¹¹ that they don’t have to be, and that we can have a healthy plant-based diet,” she says.

Macmillan emphasizes that a successful transition to a healthier and more climate-friendly food system in New Zealand depends on the implementation of equitable policies that support the country’s various population groups. “In a country with high levels of food poverty, we now need to focus on designing food policies that ensure all individuals have access to healthy and affordable climate-friendly food options,” she explains.

Boyd Swinburn, a professor of population nutrition and global health at the University of Auckland who was not involved in the study, says he plans to incorporate the team’s data into a diet-modeling program he first helped develop in 2018.¹² This will allow researchers and policy makers to compare the carbon footprints and costs of current New Zealander diets against a wide range of healthier options. “A lot of people are personally invested in a high-meat diet,” Swinburn says, “so there is a lot of work to get the science out there to overcome some of these beliefs and the commercial pushback.”

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